

Nucleic Acid Purification System

NPA-32

**User's Manual**

**Hangzhou Bioer Technology Co.,Ltd.**

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**Note:** The Bioer Co. reserves the right to modify this manual at any time without notice.

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**Please read this manual carefully before operating the machine!**

## Important Note

### 1. CONVENTIONS

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**Note:** Because of the important information in this column, please read it carefully. Failure to follow the advice in this column will possibly result in damage or malfunctioning of the machine.

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### 2. SAFETY

During the operation, maintenance, or repair of the machine, the following safety measures should be taken. Otherwise, the guard provided by the machine is likely to be damaged, the rated safety level to be reduced, and the rated operation conditions to be affected.

*The Bioer Co. shall not be in any way responsible for the consequences resulted from buyer's not observing the following requirements.*

#### a) Grounding Considerations

A.C. power's grounding should be reliable for fear of an electric shock. The 3-pin plug with the machine's power line is a safety device that should be matched with a grounded socket. Never let the third ground pin floating. If the 3-pin plug cannot be inserted, it is recommended to ask an electrician to install an appropriate power socket.

#### b) Keep Away from Electric Circuits

The operator is not allowed to open the machine. Changing components or adjusting certain parameters inside the device must only be accomplished by the certificated professional maintenance personnel. Do not change elements while the power is still on.

#### c) A.C. Power Considerations

Before turn on the power, always check and insure that the mains voltage is within the required **A.C. 100-240V** and insure that the current rating load of the power socket meet the required specification.

#### d) A.C. Power Line Considerations

As an accessory of the machine, the A.C. power line should be a default one. If it is damaged, the A.C. power line can not be repaired, but must be replaced with a new one. The power line should be free of heavy objects during the machine's operation. Keep the power line away from the place where people ambulate frequently.

e) Connect the A.C. Power Line

While connect or disconnect the power line, you should hold the 3-pin plug with your hand. Insert the plug thoroughly into the socket to ensure good contact between the plug and socket. Pull the plug, not the line, when you need to disconnect to the mains.

f) Design Environments

The machine should be placed in a low-humidity, dust-free, and good-ventilation room without caustic gas or powerful magnetic interference. In addition, water sources, such as pools and water pipes, should be separated a distance from the machine.

Never cover or obstruct the openings of the machine, which are designed for ventilation and to prevent the device's interior from being too hot. When a single device is running, the shortest distance between its openings and the nearest object is 25cm; otherwise, when two devices or above are running at the same time, the shortest distance is 40 cm. Do not place the device on a soft surface, because that will result in adverse ventilation near the device's bottom openings.

Too high temperature will lead to degraded performance or failure of the machine. Therefore, the device should be protected against any kind of heat sources like sunlight, ovens, or central heating equipment.

If the machine is set aside for a long time, it is recommended to disconnect the power line to mains and cover the device with a piece of soft cloth or plastic to prevent dust from entering.

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**Note:** Once one of the following events occurs, you are suggested to disconnect the power line with mains, and contact the distributor or ask a certificated maintenance worker for help.

- Liquid into the device;
  - The device sprinkled or drenched;
  - The device malfunctioning, giving off abnormal sound or odor;
  - The device falling onto the floor or its shell damaged;
  - Significant changes in the device's performance.
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### 3. WARRANTY AND SERVICE INFORMATION

a) Warranty

The nucleic acid purification system is warranted for a period of one month, from date of shipment from the company, to be free from defects in material and workmanship. The Bioer Co. shall be obligated, under this warranty, to exchange the nucleic acid purification system which proves to be defective as described herein.

The nucleic acid purification system is also warranted for a period of twelve

months, from date of shipment from the company, to be free from defects in material and workmanship. The Bioer Co.'s obligation under this warranty shall be limited to repair or exchange (at the Bioer Co.'s option) of the nucleic acid purification system which proves to be defective as described herein.

The buyer is responsible for sending the machine to the maintenance shop designated by the Bioer Co. on all warranty claims. The buyer is also responsible for the transportation expenses of the freight to the maintenance shop and the transportation expenses of the freight from the maintenance shop after it is repaired.

After the warranty comes due, the Bioer Co. reserves the right to charge for maintenance of a defective device.

#### b) Warranty Terms

The above warranty is not applicable to defective devices with incorrect use, abnormal operating conditions, improper application, and unauthorized maintenance or alteration.

*The Bioer Co. makes no express warranties other than those which are described herein. Any descriptions in sales promotion under specific conditions shall not create an express warranty that the goods shall conform to such description.*

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**Note:** Once it is opened, the package should be checked according to the packing list. If the buyer finds any items to be missing or damaged, do not hesitate to contact the distributor.

Please store the package and packing materials in a safe place in case of future device maintenance. The above warranty does not extend to goods damaged as a result of cheesy package.

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Aftersales services hotline: +86-571-87774558

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## **CHAPTER 1: Introduction**

This chapter briefly introduces the feature of nucleic acid purification system and its applications.

### **1. Features:**

This type of instrument adopts a magnetic bead extraction technique to extract and purify nucleic acid through precision transmission of singlechip controlled step-motor. It has the characteristics as follows: small volume, light weight, low noise, full-closed workaround; vivid VFD display; transparent working chamber for easy observing the work conditions; touch panel with beautiful appearance and easy for operation. It has powerful functions such as door open protection, position out of limit protection and warning, which ensure its safety and reliability. The instrument is designed for extracting DNA, RNA and mRNA in whole blood, sell and tissue, which saves a lot of time and labors in laboratory.

### **2. Applications**

This type of instrument is designed to separate or purify nucleic acid, protein and tissue in molecular biological lab or clinical lab.

## CHAPTER 2: SPECIFICATIONS

This chapter describes the nucleic acid purification system' operation, transportation and storage conditions, basic parameters, performance and functions.

### 1. Normal Working Conditions

Ambient temperature: 5°C ~ 35°C

Relative humidity: ≤ 70%

Power supply: AC100-240V 100W 50-60Hz

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**Note:** Before power-on, please check whether the above working conditions are satisfied. Pay special attention to the power line's reliable grounding.

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### 2. Transportation and Storage Conditions

Ambient temperature: -20°C ~ +55°C

Relative humidity: ≤ 80%

### 3. Basic Parameters

Model Parameter	NPA-32
Sample Number	32 samples
magnetic sticks (fixed)	4×8
volume	50~800μl
Collecting efficiency of magnetic beads	>90%
Suitable size of magnetic bead	0.5~10μm
Dimension (mm)	440×380×450 (L×W×H)
Net Weight	25kg



#### 4. Performance

Work temperature: Room temperature  
Max. motor speed: 180rpm  
Max. segments: 200  
Max. dwelling time: 59m59s  
Number of programs: 25

#### 5. Software Functions

File editing and saving  
File review, modify and delete  
Pause of program running  
Stop of program running  
Sound alarm  
Failure protection and alarm

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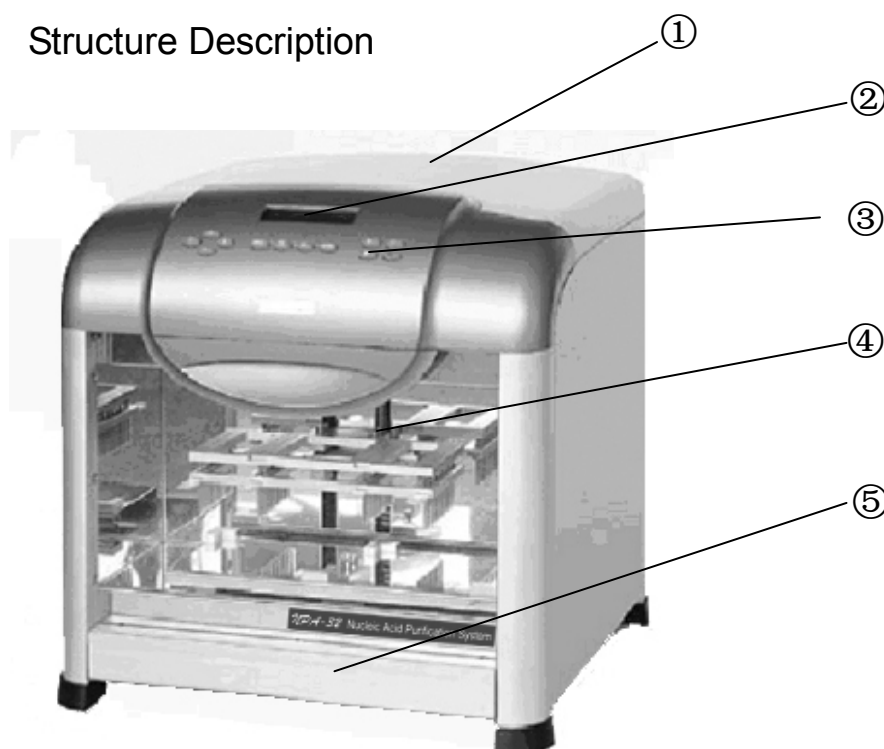
**Note:** The above software functions are for reference only. The Bioer Co. reserves the right to modify the software functions without notice.

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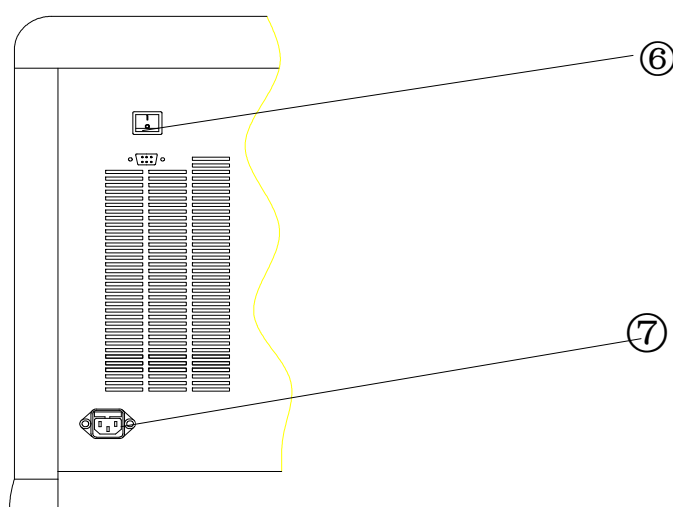
## CHAPTER 3: PREPARATIONS

This chapter introduces nucleic acid purification system's mechanical structure, the keyboard and each button's functions, and some preparations before power-on. Before any operation, please read this chapter carefully and make sure you are familiar with the steps introduced.

### 1. Structure Description



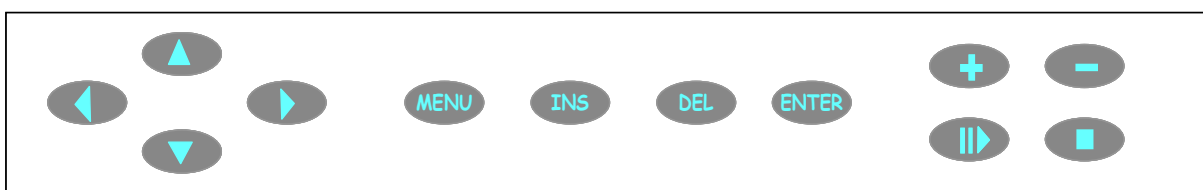
### Back of Nucleic Acid Purification System



- |            |           |                                     |           |
|------------|-----------|-------------------------------------|-----------|
| ①case body | ② display | ③conductive rubber<br>(touch panel) | ④workroom |
| ⑤lid       | ⑥ switch  | ⑦socket (with fuse)                 |           |

**Note:** The fuse specifications are as follows: F 250V 3A Ø5×20. The fuse should be replaced by one that meets those specifications. If you need certificated fuses, please contact the distributor or manufacturer.

## 2. Touch Panel Diagram



## 3. Introduction of pressing keys



“left”, moving the cursor one position to the left when pressed during file parameter setting.



“right”, moving the cursor one position to the right when pressed during file parameter setting.



“cursor moving /PgUp”

- Select different item when pressed in the menu of system setting;
- Turn to the upper segment when pressed in the menu of file editing.



“cursor moving/PgDn”

- Select different item when pressed in the menu of system setting;
- Turn to the next segment when pressed in the menu of file editing.



“Function key” (confirmation), in file setting, press to accept the current setting value or selected item and display contents of next page

Note: In system setting menu, press to save the current setting value and stay in the current menu.



“Function key” press to select/set file number or setting parameters by rolling.



“Function key” press to select/set file number or setting parameters by rolling.



“Start/Pause” when file is running, press to stop running file and press one more time to restart file running.



“Pause”, press to stop running file when file is running, and the system will turn back to the main menu.



“Insert”, press to insert one segment during file edit;



“Delete”, press to delete one segment during file edit.



Press to turn back to the main menu.

#### 4. Check-up before Power-on

Before switch the power on, please check and ensure that:

- 1) Supply voltage falls within the specified limits (refer to Chapter 2);
- 2) The plug has been inserted into the power socket reliably;
- 3) The grounding of the power line is reliable;
- 4) Make sure that the 96 wells micro- plate is put in the right place.

#### 5. How to place 96- well deep- plate

- a) There are four locking blocks in the 96-well deep-plate. Two locking blocks in one side have one small bump each with limit, while another two locking blocks in another side have corresponding small bumps without limit, but there is a slotted

- block in the middle;
- b) Please slope the 96-well deep-plate slightly when place it, and input its borders into the locking block with small limited bumps, then press another side of the plate downwards, so that the slotted block with flexibility will keep off; Finally, the flexible slotted block will compress the micro-plate tightly after the plate is input.
  - c) Note: please make sure that the 96-well deep-plate is placed in leveling condition before power on.

## 6. Power on procedure

Turn on the power of Nucleic Acid Purification system, the LCD will display 'self- test please waiting. That means the device is under self-testing, which will last for about 10 seconds. Please wait patiently. If the self-testing is past, the main menu will be displayed, and the device is ready for operations such as file edit, review, modify, or delete.

## CHAPTER 4 OPERATION GUIDE

In this chapter, we explain in details how to edit, review, modify or delete a file, as well as how to run or stop the file. Meanwhile, we will introduce the meaning of the protection interface which appears during the file running.

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**Warning!** Please turn off the power immediately and contact the distributor, if an abnormal sound or display appears after power-on, or if there is a failure alarm and display in the process of self-testing.

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☺ **Are you ready? Let's begin!**

### 1. How to edit a new program file

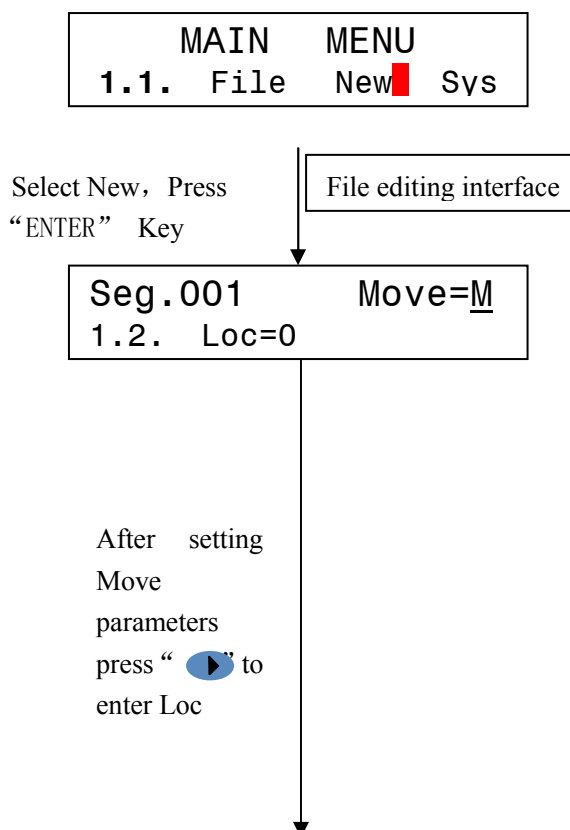
Enter the main menu, press “▶” or “◀” to move the cursor to item “New”, then press “ENTER” key.

Seg.001 indicates the first segment, which is carried out by the system automatically, and maximum segments are 99. Press “▶” or “◀” to move the cursor onto “Move” item.

#### ➤ **Move: Set moving parts**

Press “+” or “-” to shift among the four parameters M/T/P/E.

- M—shows magnetic stick moving up and down;
- T—shows magnetic stick and Tip moving up and down together;
- P—shows micro-plate moving;
- E—shows file edit ends, and this is



the end segment of a file.


➤ **Loc: Set target position of moving parts**

Press “” or “” to shift among 0-5

- 0—shows no moving;
- 1—shows move to 1/5 position of maximum moving distance;
- 2—shows move to 2/5 position of maximum moving distance
- ...
- 5—shows move to the position of maximum moving distance

**Note: When setting value in "MOVE" is P and "LOC" displays 5 (unchangeable), moving distance is default.**

Seg.001	Move=M
1.3. Loc=5	



After setting  
Loc  
parameters,  
press “” to  
enter Hold

Press “” or “” to move among time period



➤ **Hold: Set dwelling time after moving part stops**

**It should be between 00m01s to 59m59s**

When cursor is at tens place, press


“” or “” to increase/decrease ten minutes or ten seconds;

When cursor is at units order, press

“” or “” to increase/decrease one minute or one second.

Seg.001	Move=M
1.4. Loc=5	


Press “Enter”  
to enter  
Seg.002 after  
setting Seg.001  
parameters

Press  to  
go back and  
reset

As per method of setting parameters in Seg.001, to go on with setting Seg.002.

Seg.002	Move= <u>I</u>
1.5. Loc=2	


Press “Enter” to enter next segment  
after setting Seg.002 parameters

Press  to go  
back and reset

Seg.003	Move= <u>P</u>
1.6. Loc=5	

Seg.xxx	Move= <u>M</u>
1.7. Loc=5	

Press “Enter” to  
enter ending segment  
after setting all  
parameters

Press  to go  
back and reset

Set “XX” segment parameters.

**Note:**

- Normally, if a micro-plate(P) moves five times in one file, it can complete a purification experiment. So if setting value of P exceeding five times, it will automatically stop after five times moving.

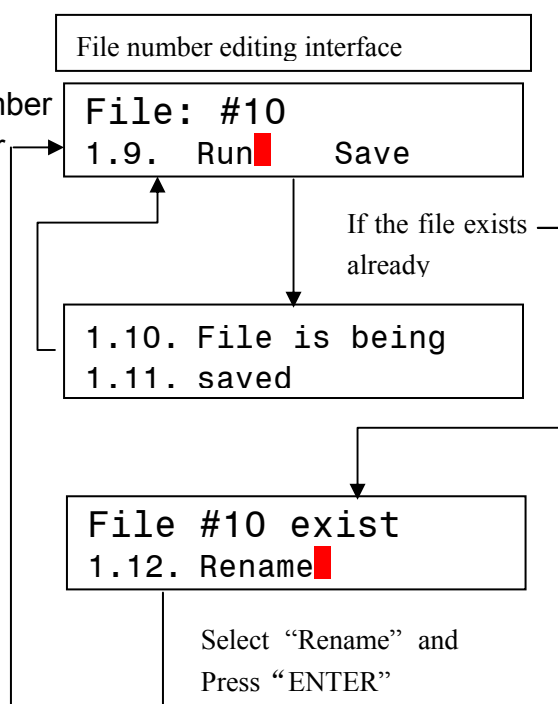
Set "MOVE" as "E" will enter into ending segment and press "ENTER" to end edition of the file and enter file number setting menu.

Seg.xxx+1	Move=E
1.8. Loc=0	Hold=00m01s

- If you want to revise previous segments during editing process, you may press "▲" to go back the segment you want to revise. After the revision, press "ENTER" then press "▼" or "▲" to shift among different segments and go on editing.
- If you want to delete a segment, just press "DEL" to delete it after you enter this segment.
- If you want to insert a segment before one (e.g. Seg.003), move to this segment (Seg.003 in editing interface, then press "INS" to insert one segment for edit. After editing and confirming the new segment, the segment's insertion is accomplished, but former Seg.003 will become Seg.004.
- If you want to give up editing, press "MENU" to go back to the main menu at any time.

Press "−" or "+" to set file number whose range is from 10 to 34. Press "◀" or "▶" to move the cursor to "Save", then press "Enter" to enter file saving interface.

Here it shows the file is being saved, after about five minutes later, it will go back to file number setting interface.







If the file already exists, press “” or “” to make the selection.



- Select “Rename”, and press “Enter” to go back to the file number setting interface, then set a new serial number;
- Select “Overwrite”, and press “Enter” to show the new file is being saved, and the original file will be overwritten.

**Note:** In file number setting interface, press “” or “” to select;





- While “Run”, press “Enter” to run file just edited, and then enter into running interface;
- While “Back”, press “Enter” to return to file editing interface.
- If you want to give up operation, press “MENU” to go back to the main menu.

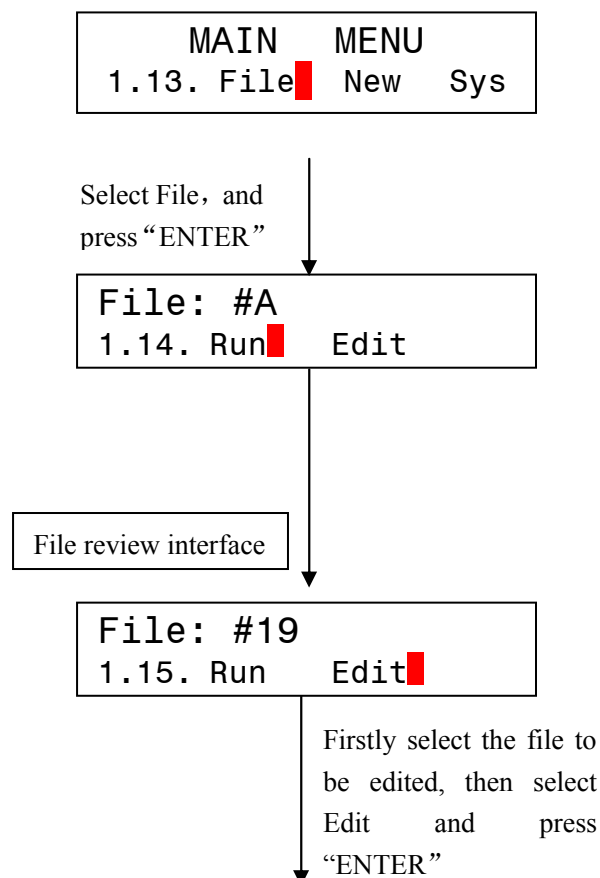
## 2. How to review and modify an Old Program File



Enter the main menu, and press “” or “” to move the cursor to File, then press “Enter”.


Press “” or “” to scroll and display existing files in item “File”.

- **#A ~ #F—indicates six certain prepared files in system;**
- **#10~#34—indicates files defined by clients.**

Firstly press “” or “” to select one existing file to edit, (e.g. File#19) then press “” or “” to move the cursor to Edit, and then press “Enter”.



Press “” or “” to shift between different segments, and revise various parameters. (please refer to Seg. 1 on “How to edit a new program file”)

- If you want to add a new segment, press “

```

graph TD
    A["Seg.xxx+1  
1.17. Loc=0"] -- "Change 'E' to other" --> B["Seg.xxx+1  
Move=M  
1.18. Loc=5  
Hold=20m20s"]
  
```





  - If you only need the several top segments of the file, press “


**Note: Six certain files prepared by the system can be edited, and can be saved as a file defined by clients.**

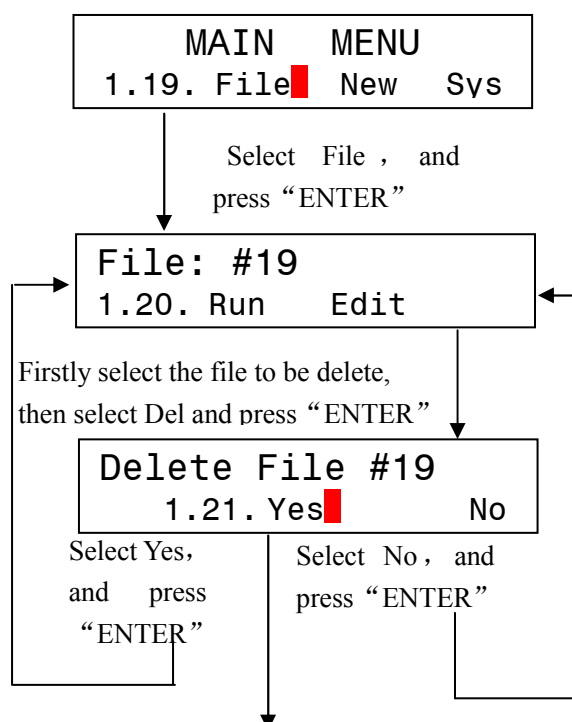
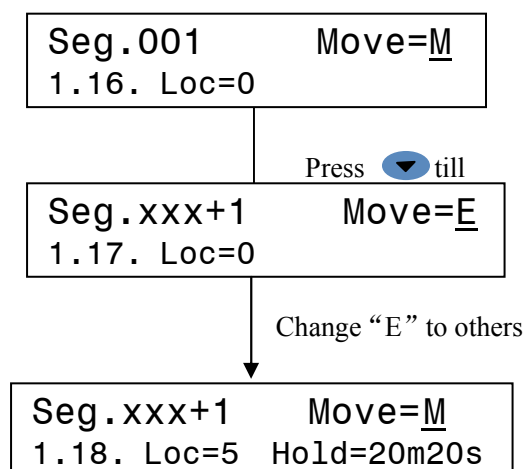
- If you want to give up editing, press “MENU” to go back the main menu at any time.

### 3. How to delete a file

Enter the main menu, and press “

Firstly press “” or “” to select the file to be deleted, then press “” or “” to select Del, and press “ENTER”.

When screen reminds whether you want to delete the selected file, press “” or



“ ◀ ” to select.

- Select “Yes”, and press “Enter” to confirm deleting the file.
- Select No”, and press “Enter” to **undelete** the file, and go back to the file checking interface.

1.22. File is being  
1.23. deleted

It shows the file is being deleted, after about five seconds later, it will go back to file review interface.

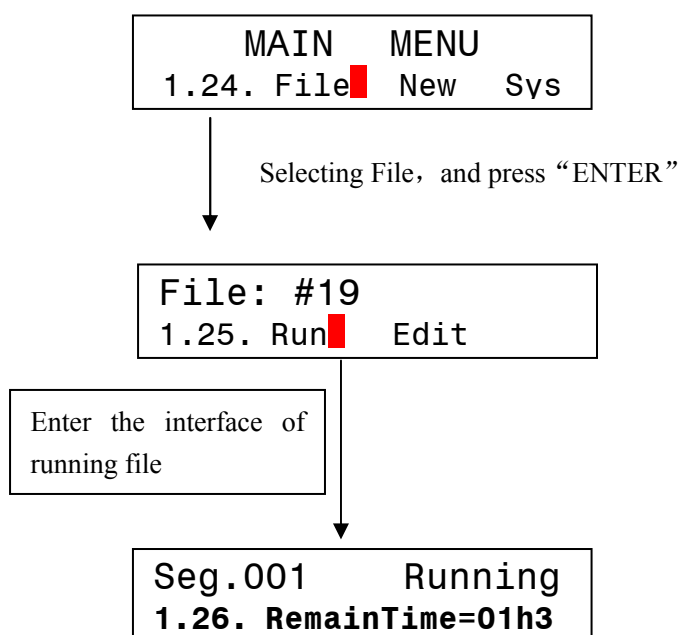
- **Note: If you want to give up editing, press “MENU” to go back the main menu at any time.**

#### 4. How to run/pause file

- Firstly enter the main menu, press “ ◀ ” or “ ▶ ” to move the cursor to “File”, and press “ENTER” .

Press “ - ” or “ + ” to select one existing file, which you want to run, (e.g.file#19), then press “ ◀ ” or “ ▶ ” to move the cursor to “Run” and press “Enter” .



Enter the interface of file running. This picture means the segment one is in running, and remaining time is 1h30m20s.





**Note: When running a file that Move=T and Loc.=3、4、5 in the segment one, while Move=P in segment two, the system will move T to the location “2”, and then perform movement of P.**

After finishing running a file, the buzzer will beep. Press “MENU” to go back to the main menu.


1.27. Operation End  
1.28. Please take

Note: Press “Start/Pause” “” during file running, the file running will be suspended, and timing will also be paused; press “” again, the file continues running, and timing will be resumed.


Seg.001 Running  
1.30. RemainTime=02h5

pressing “” to pause running  
Pressing “” again to resume running

Seg.001 Pause  
1.31. RemainTime=02h50



- Pressing “” to stop the procedure and return to the main menu during file running.



Seg.001 Running  
1.32. RemainTime=02h50

Pressing “” to stop file running and return to the main menu.

MAIN MENU  
1.33. File New Sys

## 5. Review system default file

Enter the main menu, and click “” or “” to move the cursor to “Sys”, then click “ENTER”.

Enter Default File option, then click “” or “” to review default file name (#A~#F). Click “MENU” to go back to the main menu.

MAIN MENU  
1.34. File New Sys

System setting interface

Select Sys, and press “ENTER”

1.35. Default File=#A

## 6. Protection interface

➤ Open the door when file is running, it appears a “Door open protection interface”.  
The buzzer will alarm and running will be paused.  
Close the door. Running will be resumed.

Door open protection interface

Door Open

➤ During the process of running, when unexpected situation results in moving part exceeds maximum position, an “exceeding position limit protection interface” will appear, meanwhile the buzzer alarms, and the file stops running and then go back to the main menu.

Exceeding position limit protection interface

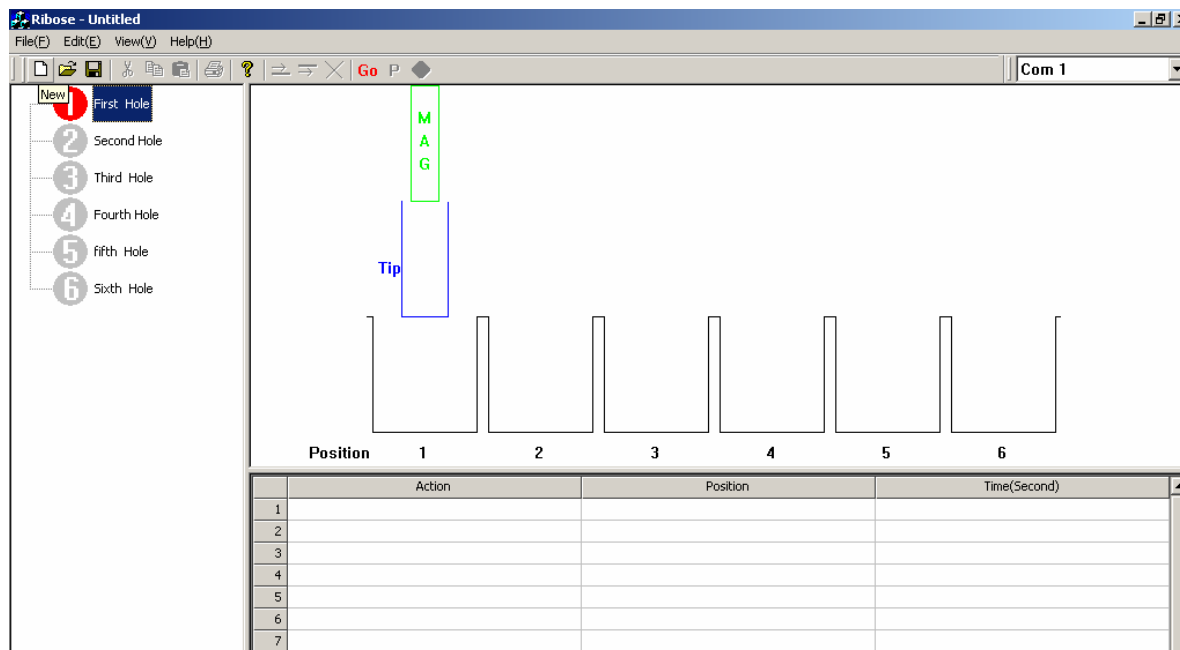
Location Out

## 7. Interface of Operating Micro-computer

You can program, set and run files through connecting the machine with computer by RS232 connection, please refer to the following steps:

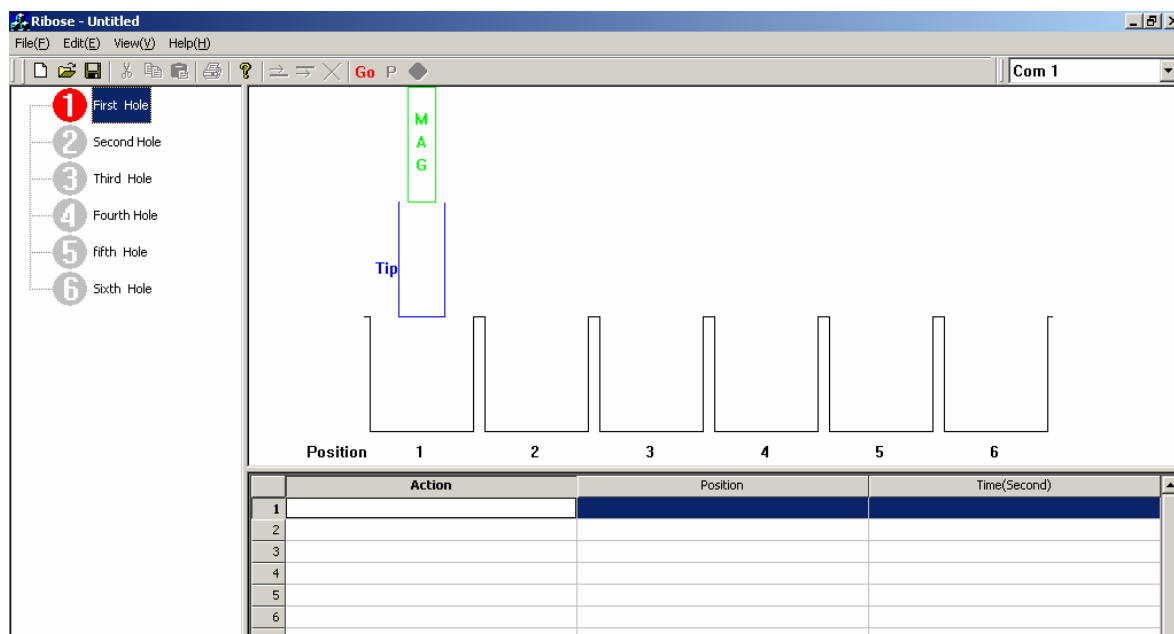
### 7.1. Newly-built files

Newly-built files in the pop-up menu from File Column(F):

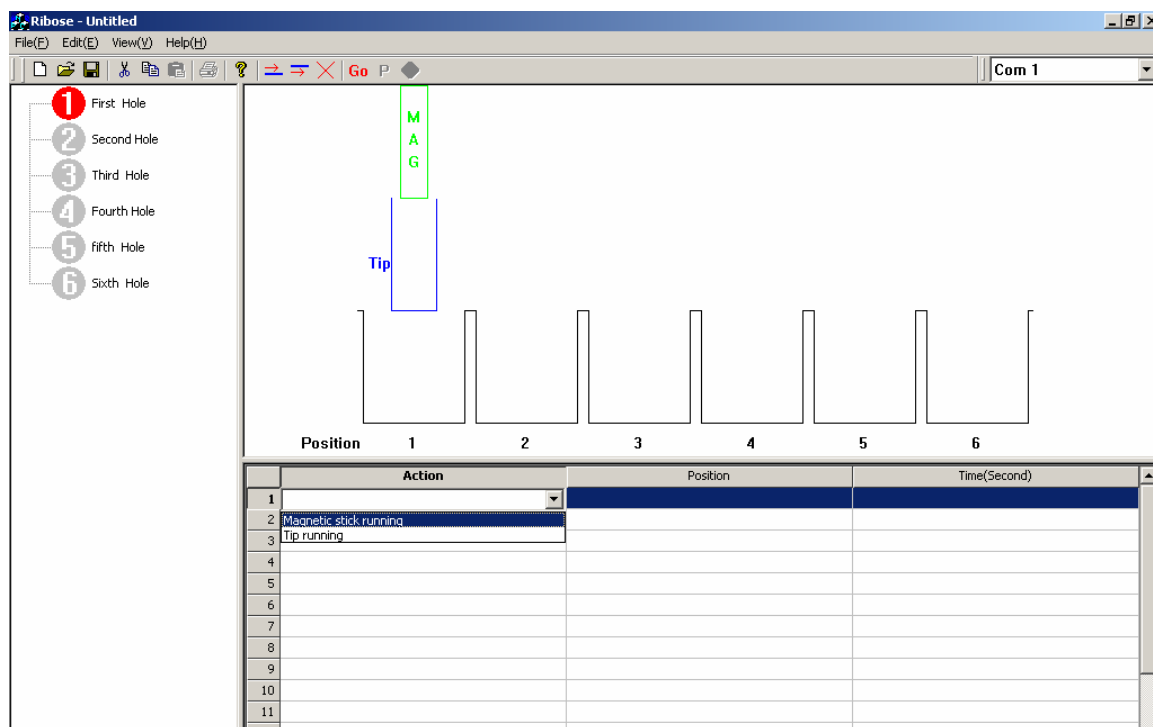


## 7.2. Choose operation holes

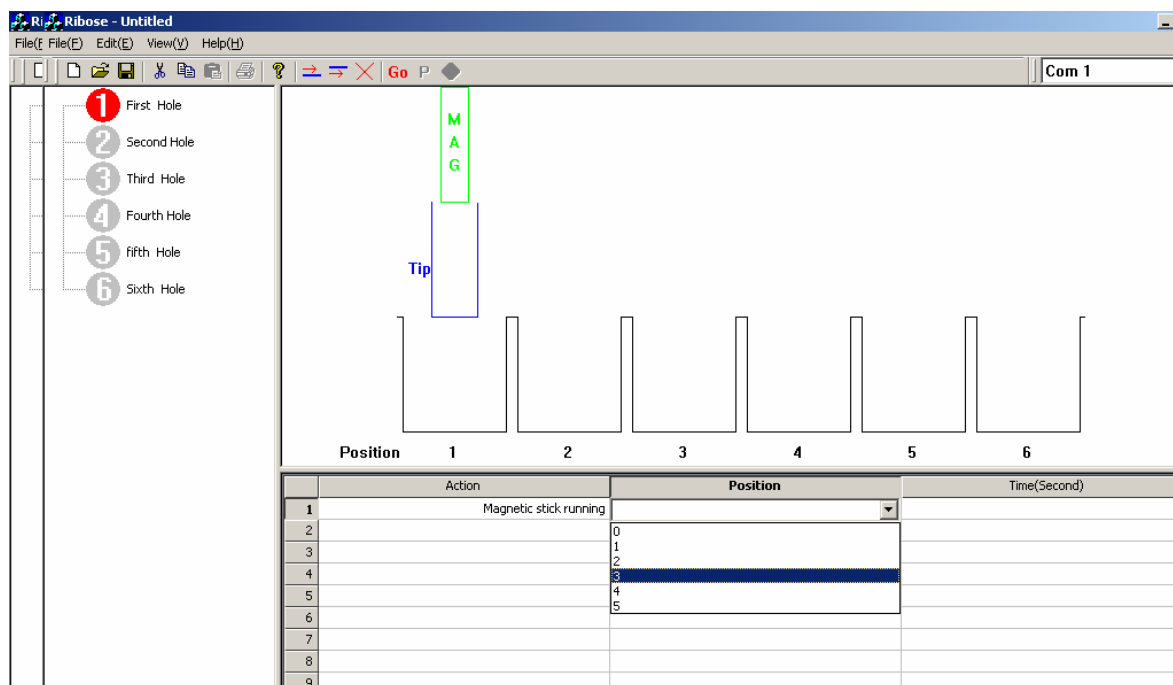
Each hole location means one line (8 holes)



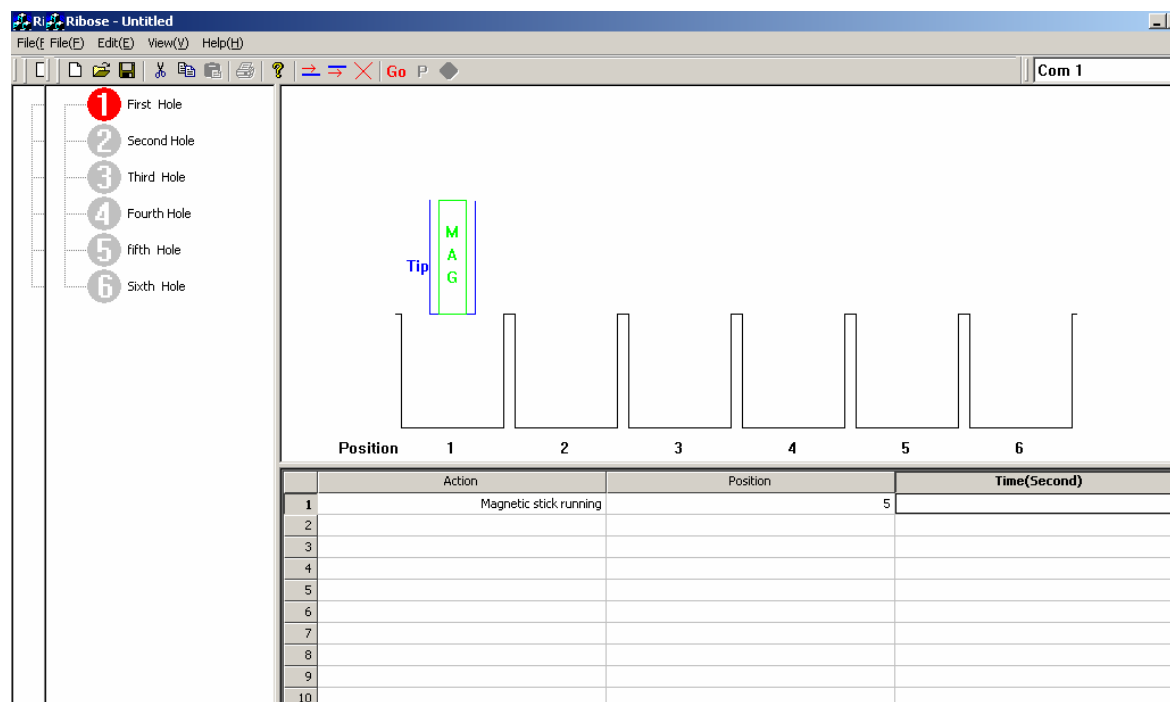
## 7.3. Click the pop-up menu from Action Column, then choose " Bar Magnet Action " or " Tip Action "



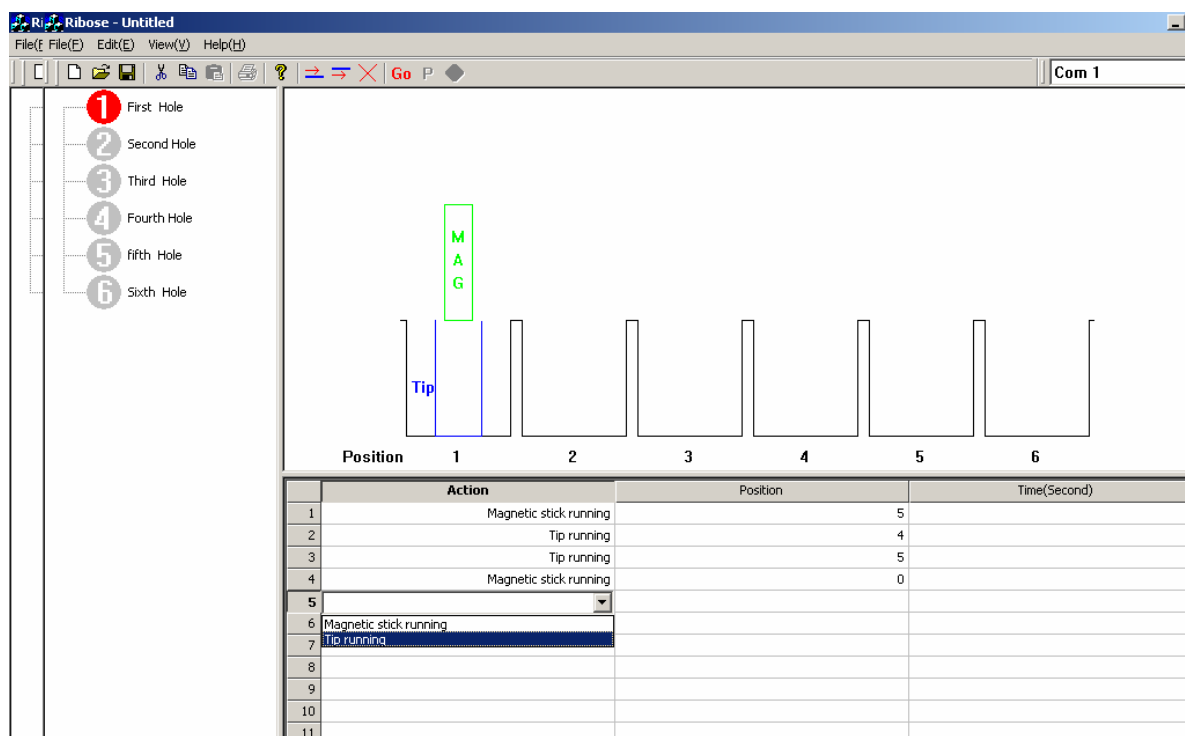
#### 7.4. Click pop-up menu from Location Column to choose the action's location



#### 7.5. Click Time (Second ) Column, and input the detention time of action

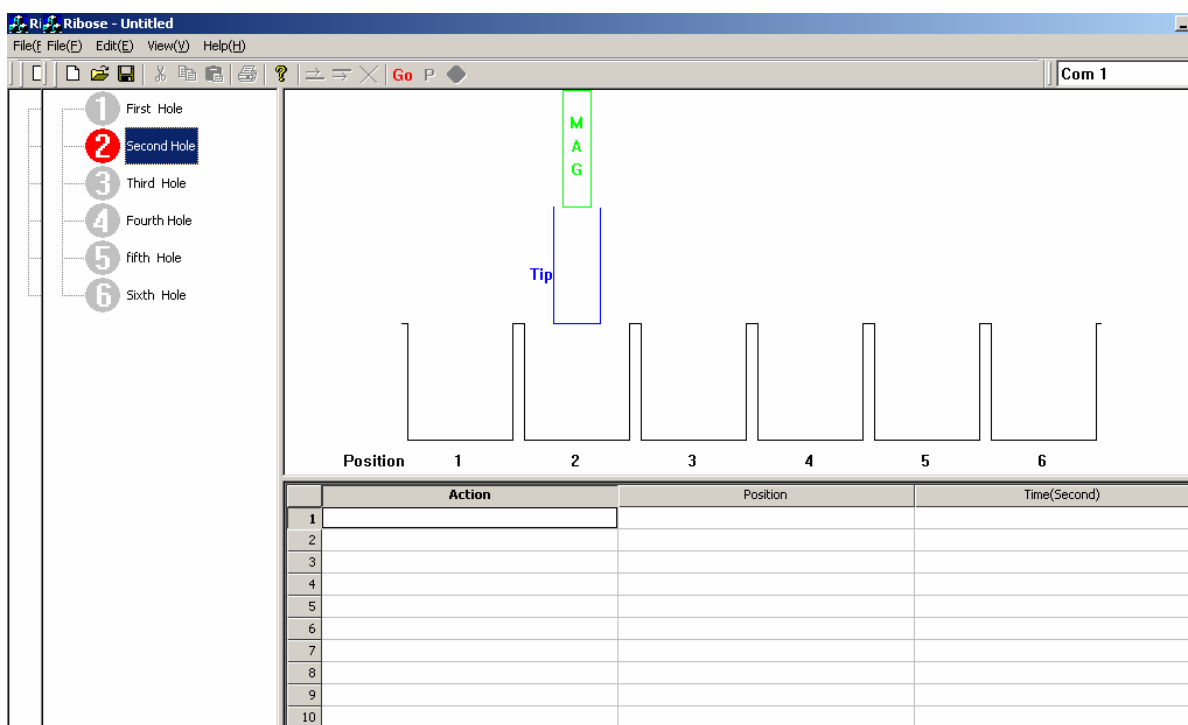


## 7.6. Repeat the steps 3-5, and program actions that you need



	Action	Position	Time(Second)
1	Magnetic stick running	5	
2	Tip running	4	
3	Tip running	5	
4	Magnetic stick running	0	

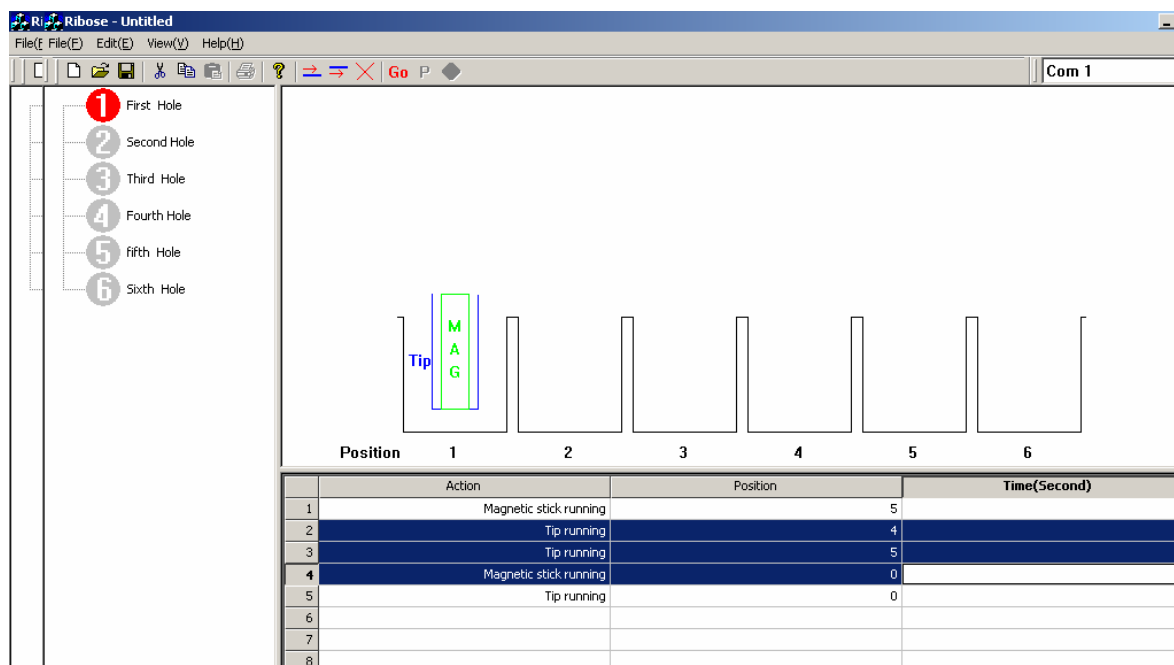
## 7.7. Set actions you need for other holes according to steps 3-6



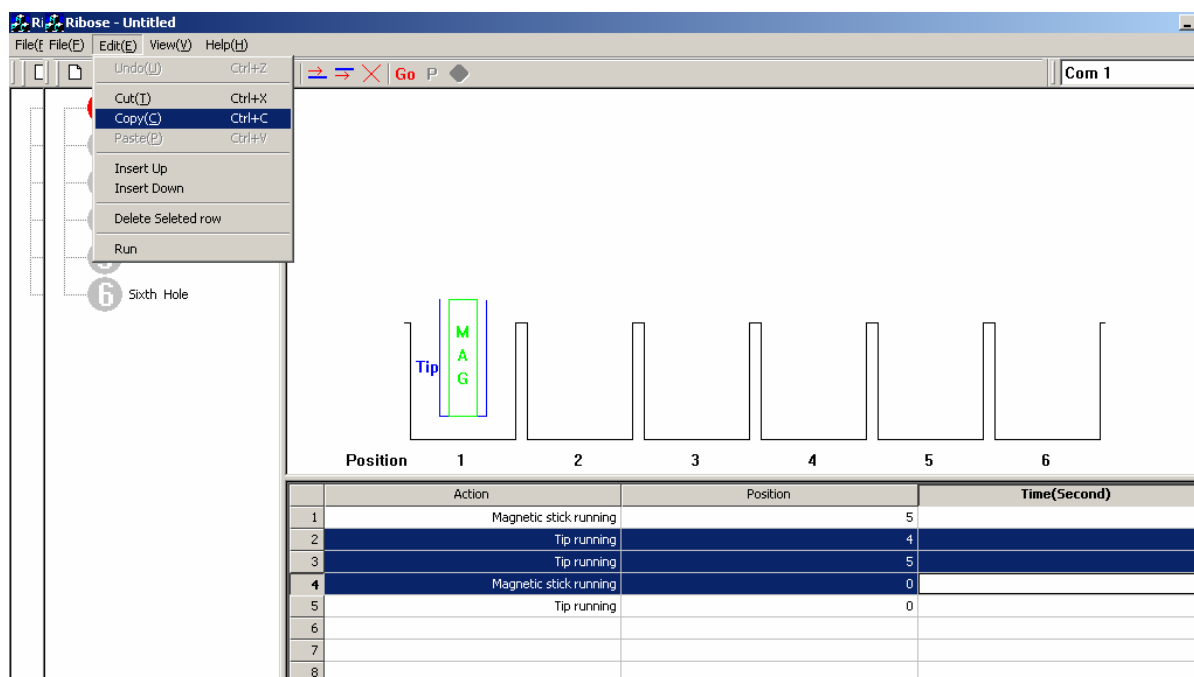
	Action	Position	Time(Second)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			



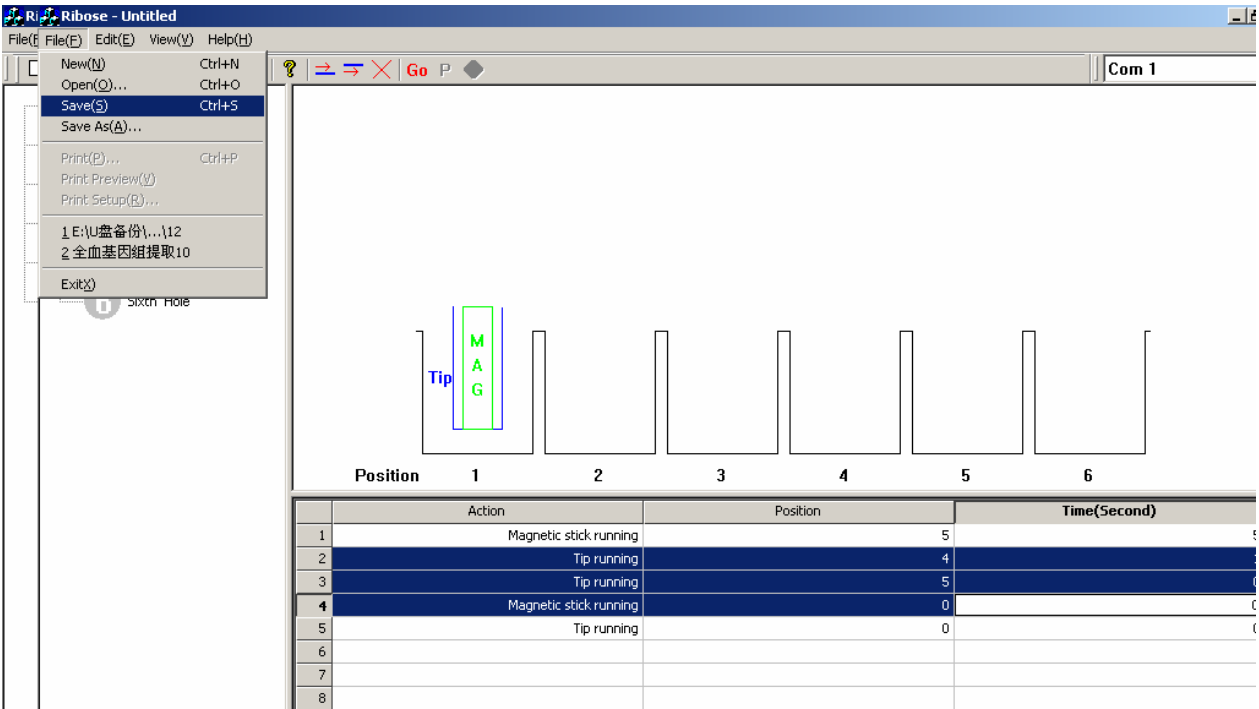
7.8. Edit, duplicate, stick, insert or delete the actions you choose through choosing action line by pulling mouse if necessary



7.9. Please click "Save" after programming is finished



7.10. Run the procedure after choosing the edited file



## CHAPTER 5 FAILURE ANALYSIS AND TROUBLESHOOTING

In this chapter, we briefly represent possible failures, reason analysis and troubleshooting.

### Failure analysis and troubleshooting:

No	Phenomenon	Reason analysis	Troubleshooting
1	No display after power-on	Disconnected power supply	Check power supply for correct connection
		Bad fuse	Replace it (F 250V 3A $\phi$ 5 $\times$ 20)
		Switch failure	Replace it
		Others	Contact distributor or manufacturer
2	Beeps after power on and the screen displays: <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">system error</div>	Self-testing error	Contact distributor or manufacturer
3	Beeps during file running, and the screen displays: <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 5px auto;">Location Out</div>	Moving part is out of position limit	Run the file again; Contact distributor or manufacturer
8	Abnormal characters displayed	Bad contact of chip with its socket	Contact distributor or manufacturer
		Chip malfunctioning	
9	Inactive keys	Switch of touch panel destroyed	Contact distributor or manufacturer

**Note:** During warranty terms, the user is forbidden to open the instrument to check. Please contact distributor or manufacturer if there is a need to open the device to check a failure listed in the above table.

(The Bioer Co. reserves the right to modify this Wiring Diagram at any time without notice.)

